

REMARKS

Applicants thank the Examiner for the thorough consideration and attention given the present application. By this amendment, Applicants provide a replacement specification and an amended abstract. Also by this amendment, Applicants cancel claims 1-13, and 24, amend claims 14-23, and 25-32, and add new claims 33-36.

Specification Objection

Applicants respectfully submit an amended specification, including claims, as requested in the Office Action. Applicants note that no new matter is added to the specification by this amendment, and that amendments are only made to correct the grammatical and idiomatic errors objected to in the Office Action. Applicants specifically wish to point out that the Examiner was correct in noting that Applicants meant the VIA group of the periodic table (which currently comprises Oxygen, Sulfur, Selenium, Tellurium, and Polonium) and not the VIB group. Applicants have opted to refer to the element group in question by the IUPAC designation to avoid further confusion, and as such have amended all references to this element group to now read "IUPAC group 16" or "group 16."

Abstract

Applicants respectfully submit amendments to the abstract for the same reasons as noted above with respect to the specification amendments. No new matter is introduced into the abstract as a result of the amendments.

35 U.S.C. § 112 Rejection

Claims 12-32 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Insofar as it pertains to the presently pending claims, Applicants respectfully traverse this rejection.

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Applicants have cancelled independent claims 12 and 13 and have presented their substantive content in claims 33 and 35 respectively. Claims 33 and 35 recite all the same substantive steps and limitations of cancelled claims 12 and 13, presented now as method claims instead of process claims for the sake of clarity and to more properly focus the claims on the carbon fiber production method optimizations and enhancements presented in the specification.

Claims 33 and 35 now only recite positive method steps (e.g. “collecting”, “recycling”) with recitations of underlying structures providing enabling descriptions of how those steps are carried out. Applicants have taken the further step of replacing the Group VIB reference with a reference to IUPAC group 16.

With respect to the language objected to in claims 16-19 and 24-32, Applicants have amended these claims to remove “any of” from the claim preamble. Applicants have also made further minor amendments to some of these claims for the sake of clarity and readability.

At least in view of the above, Applicants respectfully submit that the claims as presented in this Response now satisfy the requirements of 35 U.S.C. §112, second paragraph. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Priority - § 102(b) and § 103(a) Lyu Rejections

Applicants respectfully submit that the present application is a national-stage entry of PCT Application JP03/09027, which has an international filing date of July 16, 2003. The filing receipt mailed by USPTO on September 9, 2005 (confirmation no: 8796) for the present Application states that this Application is a 371 of PCT/JP03/09027. Applicants therefore submit that July 16, 2003 is the effective U.S. filing date of the present application.

Applicants submit that the effective filing date of the present application renders the §102(b) rejection based on *Synthesis and characterization of high-quality double-walled carbon nanotubes by catalytic decomposition of alcohol*, Chem. Commun. 2003: 1404-1405 by Lyu, et

al. (hereafter "Lyu") improper since Lyu's publication date is less than one year before the effective filing date of the present application.

Applicants also respectfully submit a certified translation of Japanese Patent Application No. 2002-208800 (filed 7/17/2002) to perfect their claim of foreign priority. Applicants respectfully submit that this fully disqualifies Lyu as a reference because Lyu's publication date is after the priority date claimed by Applicants. Applicants therefore submit that the §103(a) rejection based on Lyu is now moot.

At least for the reasons set forth above, reconsideration and withdrawal of the above-mentioned rejections is respectfully requested.

35 U.S.C. § 102(b), 35 U.S.C. § 102(a) and § 103(a) Mayurama Rejections

Claims 12 and 13 stand rejected under 35 U.S.C. § 102(b) as being unpatentable over Maruyama, et al., *Low-temperature synthesis of high-purity single-walled carbon nanotubes from alcohol*, Chemical Physics Letters 2002, 360: 229-234 (hereafter "Mayurama"). Claims 12 and 13 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Maruyama in view of elements in the art that the Examiner appears to take Official Notice of, although the Examiner does not explicitly do so. Insofar as it pertains to the presently pending claims, these rejections are respectfully traversed.

§ 102(b) and § 102(a) Rejections

MPEP § 706.02.V states, in pertinent part, that "for anticipation under 35 U.S.C. 102, the reference must teach every aspect of the claimed invention either explicitly or impliedly."

Applicants respectfully submit that Maruyama does not teach or suggest, either directly or impliedly, a gas recycle of the type discussed in independent claims 33-36. Applicants further submit that in making the § 103(a) Maruyama rejection, the Office Action admits that Maruyama does not teach or suggest this type of gas recycling. Applicants therefore submit that the Office

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Action openly admits shortcomings in the § 102(b) and § 102(a) Maruyama rejections. Because Maruyama does not recite or imply a gas recycle, Maruyama fails to “teach every aspect of the claimed invention” as required by MPEP § 706.02.V. Accordingly, reconsideration and withdrawal of these rejections is respectfully requested.

§ 103(a) Rejection

Maruyama teaches the synthesis of high-purity single-walled carbon nano-tubes (SWNT) from alcohol using a catalytic chemical vapor deposition (CCVD) technique with a metal (Fe/Co) catalyst supported on zeolite.

Independent claim 33 pertains to a method of producing fine carbon fiber that requires, in pertinent part “collecting fine carbon fiber resulting from said thermal decomposition from reacted reaction gas with a first fine carbon fiber-separating and collecting apparatus; collecting fine carbon fiber resulting from said thermal decomposition from said reacted reaction gas passing through a reacted gas-cooling apparatus with a second fine carbon fiber-separating and collecting apparatus; and recycling part of the reacted gas through a gas-recycling apparatus for subsequent thermal decomposition cycles.”

Applicants respectfully submit that Maruyama makes no teaching or suggestion of “collecting fine carbon fiber resulting from said thermal decomposition ... with a first fine carbon fiber-separating and collecting apparatus.” Applicants therefore further submit that Maruyama also makes no teaching or suggestion of “a second fine carbon fiber-separating and collecting apparatus.” Applicants note that Maruyama only discloses a particular kind of carbon fiber synthesis, and specifically note that in Maruyama “the blackened sample on the boat was analyzed” and that all the analysis and discussion refers to “as grown” samples. Maruyama does not discuss the product collection and separation aspects of a carbon fiber production process, and is only concerned with the experimental results of a specific chemical synthesis. Applicants therefore submit that Maruyama makes no teaching or suggestion of either a first or a second “carbon fiber-separating and collecting apparatus” as required by independent claim 33.

Applicants therefore respectfully submit that Maruyama is deficient in its teachings with respect to independent claim 33, and further submit that these same deficiencies are present with respect to independent claims 34-36. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 102(b) Bourdeau Rejection

Claims 12 and 13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 3,378,345 to Bourdeau, et al. (hereafter "Bourdeau"). Insofar as it pertains to the presently pending claims, this rejection is respectfully traversed.

Applicants respectfully submit that Bourdeau does not teach or suggest, either directly or impliedly, a gas recycle of the type discussed in independent claims 33-36. Applicants also respectfully note that in making the § 103(a) Bourdeau rejection, the Office Action admits that Bourdeau does not explicitly or implicitly teach either a gas recycle or a "carbon fiber-separating and collecting apparatus." Applicants therefore submit that in making the § 103(a) rejection, the Office Action openly admits the shortcomings of the § 102(b) Bourdeau rejection. Because Bourdeau does not recite or imply a gas recycle or a "carbon fiber-separating and collecting apparatus," Bourdeau fails to "teach every aspect of the claimed invention" as required by MPEP § 706.02.V. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 103(a) Bourdeau Rejection

Claims 12 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourdeau. Insofar as it pertains to the presently pending claims, this rejection is respectfully traversed.

As noted above in the traversal of the § 102(b) Bourdeau rejection, Bourdeau fails to teach all the limitations of the currently pending independent claims. The Office Action relies on

an implied Official Notice of the prevalence of gas recycling and purity enhancement in the art in making a § 103(a) rejection based on Bourdeau.

Independent claim 33 pertains to a fine carbon production process that requires: “thermally decomposing at least one organic compound containing an IUPAC group 16 periodic table element, using ultra fine particles of at least one transition metal as a catalyst; collecting fine carbon fiber resulting from said thermal decomposition from reacted reaction gas with a first fine carbon fiber-separating and collecting apparatus; collecting fine carbon fiber resulting from said thermal decomposition from said reacted reaction gas passing through a reacted gas-cooling apparatus with a second fine carbon fiber-separating and collecting apparatus; and recycling part of the reacted gas through a gas-recycling apparatus for subsequent thermal decomposition cycles.”

Bourdeau does not teach “thermally decomposing at least one organic compound containing an IUPAC group 16 periodic table element” as required by independent claim 33. Bourdeau teaches “thermal decomposition of hydrocarbons in the presence of an active gas selected from the group consisting of carbon dioxide and precursors of carbon dioxide ... e.g. oxygen containing organic compounds.” Applicants respectfully submit that Bourdeau only teaches the thermal decomposition of hydrocarbons, with the oxygen-containing organic compound acting as the “active gas” and not undergoing thermal a decomposition process. Applicants therefore respectfully submit that Bourdeau does not teach or suggest “thermally decomposing at least one organic compound containing an IUPAC group 16 periodic table element” as required by independent claim 33.

The Office Action goes on to state that “one of ordinary skill in the art would employ a recycle stream.” (Page 9 of Office Action). Applicants respectfully submit that without at least one concrete example of what sort of recycle stream the Examiner is referring to, as well as a showing of how it would be combined with the applied reference, this basis of rejection is insufficient to establish a prima facie showing of obviousness.

Applicants further submit that no type of gas or raw material recycling is taught or suggested by Bourdeau, nor would it be an obvious thing to try based on Bourdeau's teachings. Applicants note that Bourdeau contains no teaching, suggestion, or any other hint that the chemical reactions described therein are anything but complete. Bourdeau makes no reference to any output of the reaction taught therein other than the graphite whiskers produced. Lacking any indication that the inputs to Bourdeau's reaction are not fully consumed during the reaction process, there is no reason to believe that there is anything worth recycling for subsequent reaction steps.

At least in view of the Above, applicants respectfully submit that Bourdeau does not teach all the claim limitations it is relied upon by the Office Action to teach. Applicants further submit that the Office Action fails to make a prima facie showing of obviousness with respect to those elements the Examiner implicitly takes Official Notice of. Applicants therefore submit that Bourdeau is deficient in its teachings with respect to independent claim 33, and further submit that these same deficiencies are present with respect to independent claims 34-36. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

New Claims

While referred to above in conjunction with replacement claims 33 and 35, Applicants wish to specifically note that claims 34 and 36 are new apparatus claims that correspond to the structural elements recited in claims 33 and 35. Applicants respectfully submit that claims 34 and 36 are patentable over the currently applied references for all the reasons already stated above.

Dependent Claims

Applicants respectfully submit that claims 14-32 are patentable over the currently applied references at least by virtue of their dependence from independent claims 33-36.

Pinpoint Citations

Applicants understand and appreciate the requirement that all claims must be supported by the specification, but are not aware of a precedent or a requirement of providing specific citations to the specification to support claim amendments. In the interest of expediting the examination process, Applicants respectfully submit that general support for new independent claims 33-36 can be found in pages 10-25 of the specification.

Conclusion

In view of the above remarks, it is believed that claims are allowable.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Terrell C. Birch, Reg. No. 19,382, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

Dated: February 22, 2008

Respectfully submitted,

By 

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Attachments: Marked Up Copy of Substitute Specification
Clean Copy of Substitute Specification
Certified Translation of Japanese Patent Application No. 2002-208800

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